

WHAT IS CLAIMED IS:

1. A pellicle comprising a thin film optimized for transmission of off-axis incident light at a desired angle.

2. The pellicle of Claim 1, further comprising an optical thickness greater than a design thickness by less than or equal to approximately one-quarter of an exposure wavelength.

3. The pellicle of Claim 1, wherein the thin film produces a transmission maxima at a wavelength between approximately one nanometer and approximately twenty nanometers above an exposure wavelength.

4. The pellicle of Claim 1, further comprising an anti-reflective coating disposed on at least one of a top surface and a bottom surface of the thin film, the anti-reflective coating producing a transmission maxima at a wavelength between approximately one nanometer and approximately twenty nanometers above an exposure wavelength.

5. The pellicle of Claim 4, wherein the anti-reflective coating includes a thickness between approximately one-quarter of an exposure wavelength and approximately one-half of an exposure wavelength.

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6. The pellicle of Claim 1, further comprising a plurality of adjoining anti-reflective coatings disposed on at least one of a top surface and a bottom surface of the thin film, each of the anti-reflective coatings
5 including a different refractive index.

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7. A pellicle comprising a thin film including an optical thickness greater than a design thickness that produces a transmission maxima for normal incidence light at an exposure wavelength, the optical thickness
5 optimized for transmission of off-axis incident light at a desired angle.

8. The pellicle of Claim 7, further comprising the optical thickness greater than the design thickness by
10 less than or equal to approximately one-quarter of the exposure wavelength.

9. The pellicle of Claim 7, wherein the thin film produces a transmission maxima at a wavelength between
15 approximately one nanometer and approximately twenty nanometers above the exposure wavelength.

10. The pellicle of Claim 7, further comprising an anti-reflective coating disposed on a top surface and a
20 bottom surface of the thin film.

11. The pellicle of Claim 10, wherein the anti-reflective coating includes a first refractive index approximately equal to the square root of a second
25 refractive index associated with the thin film.

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12. The pellicle of Claim 10, wherein the anti-reflective coating produces a transmission maxima at a wavelength between approximately one nanometer and approximately twenty nanometers above the exposure
5 wavelength.

13. The pellicle of Claim 10, wherein the anti-reflective coating includes a thickness between approximately one-quarter of the exposure wavelength and
10 approximately one-half of the exposure wavelength.

14. The pellicle of Claim 7, further comprising a plurality of adjoining anti-reflective coatings disposed on a top surface and a bottom surface of the thin film,
15 each of the anti-reflective coatings including a different refractive index.

15. The pellicle of Claim 7, wherein the thin film comprises an amorphous fluoropolymer.
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16. The pellicle of Claim 7, wherein:
the thin film includes a thickness of approximately 855 nanometers; and
the exposure wavelength is between approximately 248
25 nanometers and approximately 436 nanometers.

17. A photolithography system for optimizing off-axis transmission of light, comprising:

a photomask; and

a pellicle comprising:

5 a frame coupled to the photomask; and

a thin film operable to transmit approximately ninety-nine percent (99%) of off-axis light at an exposure wavelength, the thin film including an optical thickness greater than a design thickness that produces a transmission maxima for normal incidence light at the exposure wavelength.

18. The system of Claim 17, further comprising the optical thickness greater than the design thickness by less than or equal to approximately one-quarter of the exposure wavelength.

19. The system of Claim 17, wherein the thin film produces a transmission maxima at a wavelength between approximately one nanometer and approximately twenty nanometers above the exposure wavelength.

20. The system of Claim 17, further comprising an anti-reflective coating disposed on a top surface and a bottom surface of the thin film, the anti-reflective coating including a thickness between approximately one-quarter of the exposure wavelength and approximately one-half of the exposure wavelength.

21. The system of Claim 20, wherein the anti-reflective coating produces a transmission maxima at a wavelength between approximately one nanometer and approximately twenty nanometers above the exposure wavelength.

22. The system of Claim 20, wherein the anti-reflective coating includes a first refractive index approximately equal to the square root of a second refractive index associated with the thin film.

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23. The system of Claim 17, further comprising a plurality of adjoining anti-reflective coatings disposed on a top surface and a bottom surface of the thin film, each of the anti-reflective coatings including a different refractive index.

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24. The system of Claim 17, wherein the frame comprises aluminum.

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25. The system of Claim 17, wherein the thin film comprises an amorphous fluoropolymer.

26. A method for performing photolithography,
comprising:

forming a thin film with an optical thickness
greater than a design thickness that produces a
transmission maxima for normal incidence light at an
exposure wavelength, the optical thickness optimized for
transmission of off-axis incident light at a desired
angle;

attaching the thin film to a frame to form a
pellicle;

mounting the pellicle to a photomask; and
exposing the pellicle and the photomask to radiant
energy having the exposure wavelength.

27. The method of Claim 26, further comprising
coating a top surface of the thin film with an anti-
reflective material, the anti-reflective material
including a thickness between approximately one-quarter
of the exposure wavelength and approximately one-half of
the exposure wavelength.

28. The method of Claim 27, further comprising
coating a bottom surface of the thin film with the anti-
reflective material.

29. The method of Claim 26, wherein the thin film
produces a transmission maxima at a wavelength between
approximately one nanometer and approximately twenty
nanometers above the exposure wavelength.

30. The method of Claim 26, further comprising
coating at least one of a top surface and a bottom
surface of the thin film with a plurality of adjoining
layers of anti-reflective material, each layer including
a different refractive index.